CLAIMS

1. A fusion protein having epitopes of at least two of the autoantigens glutamic acid decarboxylase (GAD65), islet cell antigen (IA2) and preproinsulin (PPINS) wherein said epitopes are connected with a linker peptide, said fusion protein being able to bind to a solid phase.

2. The fusion protein according to claim 1 having epitopes of each of the autoantigens GAD65, IA2 and PPINS.

3. The fusion protein according to claim 2 wherein
- the epitope of IA2 comprises the amino acids 771-979 of the amino acid sequence shown in Figure 2a,
- the epitope of GAD65 comprises the amino acids 102-585 of the amino acid sequence shown in Figure 2b, and
- the epitope of PPINS comprises all the amino acids 1-110 of the amino acid sequence shown in Figure 2c.

4. The fusion protein according to claim 1 wherein the linker peptide comprises lysine and argine residues.

5. The fusion protein according to claim 4 wherein said linker peptide is provided with a member of an affinity binding pair so as to enable the binding of said fusion protein to the solid phase.

6. The fusion protein according to claim 5 wherein the affinity binding pair is biotin - streptavidin.

7. A cDNA encoding the fusion protein according to claim 1 wherein said cDNA comprises the nucleotide sequences encoding the epitopes of at least two of the autoantigens glutamic acid decarboxylase (GAD65), islet cell antigen (IA2) and preproinsulin (PPINS).

8. A cDNA encoding the fusion protein according to claim 3

wherein said cDNA comprises the nucleotide sequences a) nucleotides 1311 to 1755 of the sequence according to Figures 3a to 3b encoding GAD65, aa 102-585, b) nucleotides 2313 to 2937 of the sequence according to Figures 3c to 3e encoding IA2, aa 771-979, and c) nucleotides 2424 to 2610 and 3397 to 3539 of the sequence according to Figure 3f-3i encoding PPINS, aa 1-110, where said nucleotide sequences a), b) and c) can appear in any relative order.

9. A vector comprising the cDNA according to claim 7 ~~or 8.~~

10. An E. coli cell encompassing the cDNA according to claim 7.

11. An immunoassay for the simultaneous determination in a sample of a person's body fluid of at least two insulin dependent diabetes mellitus (IDDM) related autoantibodies, wherein each autoantibody is specific for an epitope of the autoantigens glutamic acid decarboxylase (GAD65), islet cell antigen (IA2) or preproinsulin (PPINS), said immunoassay comprising the steps of

- incubating said sample with a fusion protein according to claim 1, said fusion protein being bound to a solid support,
- adding at least one labeled reagent capable of binding to one or more of said autoantibodies, and
- quantifying the signals from the labels bound to the solid phase.

12. The immunoassay according to claim 11 wherein the labeled reagent is an anti-human monoclonal antibody.

13. The immunoassay according to claim 11 wherein the labeled reagent comprises at least two antigens labeled with different labels, each antigen being one of the autoantigens GAD65, IA2 or PPINS; or proteins comprising epitopes thereof.

14. The immunoassay according to claim 11 wherein the labeled reagent comprises three antigens labeled with the same label, each antigen being one of the autoantigens GAD65, IA2 or PPINS; or proteins comprising epitopes thereof.

15. The immunoassay according to claim 11 wherein the label is a fluorescent lanthanide chelate.

16. A method for diagnosing a person's risk of developing insulin dependent diabetes mellitus (IDDM), said method comprising the determination in a sample of said person's body fluid of at least two insulin dependent diabetes mellitus (IDDM) related autoantibodies specific for an epitope of the autoantigens glutamic acid decarboxylase (GAD65), islet cell antigen (IA2) or preproinsulin (PPINS), wherein the presence of at least two of said autoantibodies are indicative for said person's risk of developing IDDM.

Add A1

add C4

Add E4